THE OFFICE OF REGULATORY STAFF

DIRECT TESTIMONY

OF

RANDY GUNN

JANUARY 7, 2010

DOCKET NO: 2009-261-E

Application of South Carolina Electric & Gas Company for the Establishment and Approval of DSM Programs and Rate Rider

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IN RE: APPLICATION OF SOUTH CAROLINA ELECTRIC & GAS COMPANY FOR THE ESTABLISHMENT AND APPROVAL OF DSM PROGRAMS AND RATE RIDER

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND OCCUPATION.

A. My name is Randy Gunn. My business address is 30 South Wacker Drive, Suite 3100 Chicago, IL 60606. I am employed by Navigant Consulting which merged in January 2010 with Summit Blue Consulting, LLC. Navigant Consulting provides consulting services to energy utilities, state agencies, and non-profit organizations on matters relating to energy efficiency, demand side management ("DSM"), renewable energy, resource planning, and related areas.

Q. PLEASE STATE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A. I received my Master's Degree in Planning from the University of Minnesota's Humphrey Institute of Public Affairs in 1995. My Master's coursework focused on energy, technology, and natural resources. In addition, I received a Bachelor of Arts Degree in Physics from Carleton College in 1980.

Prior to becoming employed with Navigant Consulting, I was a company founder and Principal of Summit Blue Consulting. My consulting work for the past several years

has focused on energy efficiency planning and evaluation studies that have been used as part of energy efficiency regulatory proceedings. I have recently led energy efficiency potential studies, energy efficiency program design studies, and/or the DSM aspects of integrated resource plans for American Electric Power Company ("AEP"), Consumers Energy, Duke Energy Indiana, Kansas City Power and Light, Nova Scotia Power, and Xcel Energy Minnesota. I am currently leading energy efficiency and demand response program evaluation work for Commonwealth Edison, American Electric Power, and the Southern California Public Power Authority. Before forming Summit Blue, I was employed by Sieben Energy Associates as Manager of Utility Consulting. Prior to joining Sieben Energy Associates, I held various positions at Northern States Power Company in its Demand Side Management Department. My resume is included as an Appendix.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING?

A. The South Carolina Office of Regulatory Staff ("ORS").

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to present my review and analysis of South Carolina Electric & Gas Company's ("SCE&G's" or "the Company's") demand side management application.

Q. PLEASE SUMMARIZE SCE&G'S PROPOSED DSM PROGRAMS.

A. SCE&G proposed a portfolio of energy efficiency programs that are similar to those of other investor-owned utilities which have started new energy efficiency programs in the last two years. These include:

- Residential Benchmarking — An energy information program using comparative energy use information for similar customers.

- Residential Energy Information Display — An energy information program using an in-home display of home energy use.
- Residential Energy Check-Up and Home Performance Audit — An energy audit and retrofit program.
- Residential ENERGY STAR® Lighting and Appliances — A program offering rebates for ENERGY STAR® items such as lamps, fixtures, dishwashers, and room air conditioners.
- Residential New High Efficiency HVAC and Water Heater — A program offering rebates for high efficiency air conditioners, heat pumps, and tankless water heaters.
- Residential Existing HVAC Efficiency — A program offering rebates for HVAC tune-ups, duct insulation, and duct sealing.
- Residential ENERGY STAR® New Homes — A program offering rebates for new homes that meet ENERGY STAR® standards.
- Commercial and Industrial Prescriptive — A program offering rebates for efficient commercial lighting, motors, HVAC, and food service equipment.
- Commercial and Industrial Custom — A program offering rebates for larger and non-standard energy efficiency projects.

Q. PLEASE PROVIDE AN OVERVIEW OF SCE&G'S PROPOSED DSM PROGRAMS.

A. Positive qualities of SCE&G's proposed programs include:

- The programs cover most major customer groups and end users.

- The programs represent Company savings of approximately 0.4% of baseline sales in the programs' first year.
- The residential rebate amounts are similar to those of other utilities with recently initiated DSM programs.

Other observations include:

- There is no low-income customer program that provides free energy efficiency measures. Most utilities implementing large scale DSM programs generally offer such low-income customer programs. SCE&G's proposed approach to serving low-income customers is to offer them slightly larger rebates than other customers for participating in Tier 2 of the Residential Energy Check-up and Home Performance Audit program.
- The customer fees for the Residential Energy Check-Up and Home Performance Audit program are high. SCE&G estimates that contractors will charge customers $300 to $600 for the Tier 2 energy audit. Navigant Consulting is not aware of other utilities offering this type of program with similar fees. Generally, the customer cost of energy audits is reduced below cost by utility program funds.
- For the commercial and industrial programs, little information is provided regarding the rebate amounts that will be offered through the programs. In David Pickles' testimony, tentative rebates are shown for commercial lighting measures, but not for other end uses. The rebates in the draft schedule shown on page 23 of the Appendix to Mr. Pickles' testimony are difficult to compare because the savings shown in the table are minimum watt savings instead of the average or typical savings shown by most utilities. In many utility DSM regulatory program

plans, more detailed information regarding the proposed programs' incentive strategies and evaluation plans is generally provided.

- The Company is not proposing a stand-alone small business program, and instead proposes to include small businesses as part of its commercial and industrial programs. DSM industry experience has shown that small business customers participate in low numbers in programs more targeted towards larger commercial and industrial customers. Often utilities offer special programs for small business customers, or allow small business customers to participate in certain residential programs.
- The Company proposes a program year of December 1st to November 30th. Program years that are different than calendar years are not that uncommon, but these program years are generally linked to other regulatory or budget years for consistency. It would be better if the proposed program year conformed to the calendar or fiscal year.

Q. WHAT RECOMMENDATIONS DO YOU HAVE REGARDING SCE&G'S PROPOSED DSM PROGRAMS?

A. Our recommendations include:

- Developing a stand-alone low-income customer energy efficiency program.
- Adding a residential appliance recycling program in program year two. This type of program is aimed at customers having secondary refrigerators, freezers, and room air conditioners. The second unit in most customers' homes is usually an older, inefficient unit. The program typically offers a free service which collects these appliances from customers and offers a small participating incentive

generally between $25 and $50. The units are disassembled and the spare parts and refrigerant are appropriately disposed of.

- Lowering the customer fees for the Residential Energy Check-Up and Home Performance Audit.
- Adding a commercial new construction program in program year two or three. A commercial new construction program typically provides building design assistance and financial incentives for customers building new commercial facilities, primarily offices, retail stores, schools, and health care facilities. Lost opportunities which occur when new buildings are built without regard to energy efficiency are also avoided. It is much more expensive and time consuming to install energy efficiency measures after construction than it is to integrate efficiency into buildings as they are being designed and built.
- Providing a final set of expected rebate amounts for its commercial and industrial programs. The information provided on the customer incentives to date for the Custom program is too general to gauge the reasonableness of the ultimate rebates. ORS also recommends that the minimum watt savings shown in the draft Commercial Lighting rebate table on page 23 of the Appendix to Mr. Pickles' testimony be replaced by average or typical watt savings for each measure shown. This will make the rebate costs in terms of dollars of customer incentive per kW saved easier to compare to other utilities' similar programs. In addition, ORS recommends that draft rebate tables be developed for all rebates in the Commercial and Industrial Prescriptive and Custom programs.

- Developing special programs for small business customers (SCE&G Rate SGS) or allowing small business customers to participate in certain residential programs in addition to commercial and industrial programs.
- Using a program year that matches a calendar year instead of December 1st to November 30th. This would be more consistent with standard industry practice.

Q. STATE THE KEY POINTS ON SCE&G'S PLANS FOR EVALUATION, MEASUREMENT, AND VERIFICATION ("EM&V") OF THE COMPANY'S PROPOSED PORTFOLIO OF PROGRAMS.

A. The key points of SCE&G's EM&V plans are the following:

1. SCE&G has not determined whether it will hire an independent third-party evaluator or use internal staff to perform EM&V functions.
2. SCE&G anticipates that ORS will review EM&V results.
3. EM&V is budgeted at 5% of program costs.
4. EM&V activities will follow industry best practices.
5. SCE&G proposes to use EM&V results prospectively for planning and for determining lost net margin revenue calculations.

Q. DO YOU HAVE ANY SUGGESTIONS BASED ON THE FIVE ITEMS ABOVE?

A. Yes. I will address each item below.

Q. LET'S BEGIN WITH ITEM #1 ADDRESSING INDEPENDENT EVALUATION. PLEASE DISCUSS UTILITY INDUSTRY BEST PRACTICES REGARDING EVALUATION OF DSM PROGRAMS.

A. Industry best practices dictate that SCE&G should hire an independent third-party evaluator to perform EM&V activities.

A common approach is for a program administrator such as a utility to hire an independent third-party evaluator to perform EM&V activities. This approach brings an independent perspective to the evaluation activities, and helps ensure that EM&V activities are carried out by un-biased, qualified professionals with experience practicing in the field of energy efficiency program evaluation. Use of an independent third-party evaluator is particularly important, and commonly required by regulatory agencies, when financial outcomes will be determined based on the results of EM&V activities. For these reasons, we recommend that an independent third party evaluator be hired.

Q. PLEASE DISCUSS AND COMMENT ON ITEM #2, REGULATORY OVERSIGHT OF THE PROGRAM EVALUATION PROCESS.

A. SCE&G anticipates filing annual reports to ORS and the Public Service Commission of South Carolina ("Commission") that will include program performance findings based on the results of its EM&V activities. ORS will also have the opportunity to review the EM&V findings of the third-party evaluator.

Q. PLEASE SUMMARIZE SCE&G'S PROPOSED ANNUAL REPORTING PROCESS.

A. On pages 13-14 of the Company's application, the Company "requests that in any orders issued in this docket approving the Company's DSM programs that the Commission allow SCE&G the flexibility to modify, expand, amend, terminate and/or add any program to its suite of programs going forward without the requirement to seek prior Commission approval to do so. SCE&G requests that the Commission provide for the filing of annual updates of the Company's suite of programs with the Commission

and ORS and determine at the time of such filing whether any formal review proceedings related to these programs are necessary."

Company Witness Kenneth Jackson states on page 20 of his direct testimony that "The Company will make an annual filing with the Commission regarding the reasonableness and prudence of its incurred costs of providing these programs and recalculating and adjusting the rider for each customer class. ORS will have the ability to review and audit the results of any of these programs. The Company would not implement any proposed adjustments to the rider until at least three months after filing to allow for public comment and for the Commission and ORS's review."

In addition, Company witness Felicia Howard states on pages 22-23 of her direct testimony that "All program changes would be reported in the annual filings proposed in the petition in this matter. All changes in these programs would be open to review by ORS and the Commission and the Company would specifically anticipate them to be reviewed and audited in response to the annual update filings. SCE&G believes that the review and oversight structure proposed here strikes the proper balance between efficiency and flexibility in administering the programs and the need for appropriate regulatory oversight of the decisions made."

Q. DESCRIBE THE REGULATORY REPORTING CRITERIA USED BY OTHER STATES.

A. Most states conducting large scale energy efficiency and DSM programs require utilities implementing the programs to file retrospective annual reports. These annual reports typically include the following:

- Status reports on the most significant aspects of program implementation during the year.
- Energy and peak demand savings for each program for the year.
- Adjustments to planning assumptions regarding measure savings.
- Program costs by major cost component (e.g., incentives, marketing, evaluation, R&D, other administrative) for the year.
- Program evaluation results or that year's verification/audit results if a full evaluation was not completed.
- Actual program cost effectiveness using the main cost effectiveness test recognized in the state, such as the total resource cost ("TRC") test. Often, the other major DSM cost effectiveness tests, such as the Participant test, the Utility Cost Test ("UCT"), and the Rate Impact ("RIM") test are used as well.
- Proposed new programs for the coming year.
- Proposed programs for termination and the rationales for doing so.
- Program cost recovery and financial incentive estimates and proposals.

Q. WHAT ARE YOUR RECOMMENDATIONS FOR THE ANNUAL REPORT?

A. In addition to the annual filing described by the Company, the annual report should also include the applicable key components required by other states and itemized above. These annual DSM reports provide a broader profile of the programs' status than just the financial aspects of program cost recovery. Annual reports should be filed in the Spring of each year for the preceding year's results.

Q. ARE THERE OTHER REPORTING CRITERIA?

A. Yes. In addition, most states require utilities (or non-utility program administrators as applicable) to submit a report on future programs plans every two to five years that summarize the programs the utilities are considering introducing for that period. Future program report plans typically include the following:

- Program descriptions including rebate tables.
- Summaries of major proposed program changes since the previous program plans were approved.
- Estimated program participation for each year.
- Adjustments, if any, to the energy and demand savings estimates at the measure level, and the justification for changes from the previous program cycle. These are typically derived from the program evaluation results from the previous program cycle.
- Proposed energy and peak demand reductions for each program for each year.
- Comparison of the most recent DSM potential estimates to the Company's most recent integrated resource plan.
- Budgets by major category for each year.
- Estimated program cost effectiveness.
- Program evaluation plans.

Q. WHAT ARE YOUR RECOMMENDATIONS REGARDING A REPORT ON FUTURE PROGRAMS?

A. Since the Company has proposed a three-year program plan in the current application, we suggest that the Company file future program plans every three years.

Three-year intervals between program plans filings would not be burdensome compared to annual program plans. They would also not cover such a long period as to make planning difficult to conduct accurately as five-year program plans may at this early point in the Company's DSM program life cycle. Three-year program plans should be filed in the summer before the start of the first program year covered by the plans. This will allow sufficient time for regulatory review and approval of the plans before the start of the first new program year.

Q. PLEASE DISCUSS ITEM #3, THE COMPANY'S PROPOSED EVALUATION BUDGET OF FIVE PERCENT OF PROGRAM COSTS.

A. The 5% proposed budget is reasonable. The Company's proposed evaluation budget of 5% of program costs is consistent with industry best practices and should be sufficient to allow proper program evaluations to be conducted. Evaluation costs vary depending on the type of program. Programs supporting complex efficiency measures with high levels of projected energy savings and a high degree of uncertainty require the most evaluation resources. In contrast, programs supporting simpler efficiency measures with consistent, well-documented savings (i.e., energy efficient appliances) can successfully rely on estimated savings proposed at the beginning of the programs and can be evaluated at lower costs than more complex site specific savings estimates.

Q. LET'S MOVE TO ITEM #4, MEASUREMENT AND VERIFICATION ACTIVITIES FOLLOWING INDUSTRY BEST PRACTICES. PLEASE DISCUSS INDUSTRY DSM EVALUATION PRACTICES.

A. SCE&G stated that its evaluation activities would adhere to industry best practices, though the Company did not specify any standards or protocols. Some industry

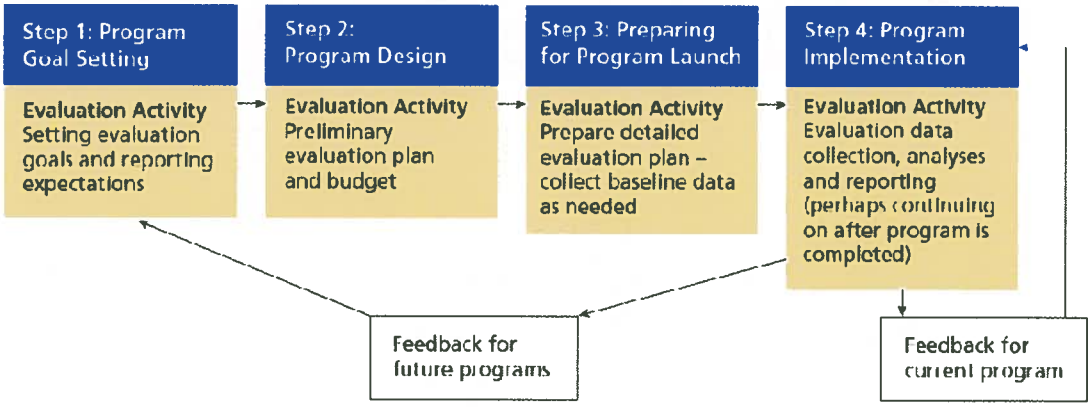
protocols for consideration when determining the appropriateness of proposed EM&V activities include the following:

- Environmental Protection Agency's ("EPA's") National Action Plan for Energy Efficiency: Model Energy Efficiency Program Impact Evaluation Guide (2007).
- 2007 International Performance Measurement and Verification Protocol ("IPMVP").

The first resource listed provides guidance of evaluation of programs, while IPMVP addresses protocols for measurement and verification at the project or site level.

Figure 1, from EPA's Model Energy Efficiency Program Impact Evaluation Guide, illustrates the relationship between evaluation activities and the program implementation cycle. This schematic helps depict the important role that evaluation plays throughout the course of the program implementation cycle.

Figure 1. Program Implementation Cycle with High-Level Evaluation Activities



Source: EPA Model Energy Efficiency Program Impact Evaluation Guide, 2007.

The standards and protocols used for EM&V should be specified by the Company to ensure that best practices are used.

Q. ITEM #5 ADDRESSES EM&V RESULTS. PLEASE DISCUSS THE COMPANY'S PROSPECTIVE USE OF EM&V RESULTS FOR CALCULATING NET LOST REVENUE RECOVERY.

A. SCE&G proposes to use EM&V results prospectively, for planning and for determining lost net margin revenue calculations. Two key uses of evaluation are to 1) improve upon existing programs and 2) ensure reliable estimates of program kW and kWh impacts.[1] Use of EM&V results for program planning purposes should be encouraged. However, use of EM&V results for calculating future lost net margin revenue is not standard industry practice and could cause significant over- or under-estimation of impacts.

As stated in Mr. Jackson's Updated Direct Testimony, the approach of using evaluation results to estimate lost net margins is overly simplistic in that it considers only verified market penetration of DSM measures by program participants. This is only one of the three important elements of DSM program evaluation. Two other important aspects of DSM program evaluations are:

- Verifying the actual DSM measure and program energy and demand savings estimates, compared to the Company's estimates for those factors. These analyses are done using customer surveys, engineering analyses and building simulation modeling, as well as billing analyses for some programs. Such analyses often find that utility savings estimates developed using industry databases use broad averages for factors for commercial and industrial customers and that these

[1] National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide. http://www.epa.gov/cleanenergy/documents/evaluation_guide.pdf

factors do not always apply to actual program participants. As an example, a recent Summit Blue evaluation study of a commercial and industrial lighting program found that most program participants were larger commercial and industrial customers who had much longer hours of operation than the utility had assumed. Thus, the evaluation based savings estimates that were developed using customer surveys and metering resulted in higher energy savings estimates than the utility had estimated from its industry database.

- Net-to-gross ratios including free ridership and spillover. New programs often use industry benchmarks for these parameters, such as an 80% net to gross estimate. However, actual program evaluation results often produce different net-to-gross ratios than the industry benchmarks.

Thus, evaluation results typically include savings adjustments based on verified measure-level energy and peak demand savings, net-to-gross ratios, as well as verified market penetration. The Company's simplistic treatment of this matter underscores the importance of hiring an independent professional third party program evaluation contractor.

Accordingly, we recommend that SCE&G utilize the three important elements of DSM program evaluation in its annual true-up.

Q. PLEASE SUMMARIZE SCE&G'S PROPOSED DSM COST RECOVERY AND INCENTIVE MECHANISMS.

A. SCE&G proposes to recover its DSM costs, lost net margin revenue, and an incentive return on DSM investments. Specifically, the proposal includes the following, detailed in Exhibit 1 of SCE&G's application:

1. **DSM program expenses and overheads amortized over five years.**
   - DSM expenses will be booked as a debit to the DSM Account.
   - SCE&G will credit the DSM Account monthly to reflect the five-year amortization recovery of DSM expenses.
2. **An incentive return for investing in DSM programs.**
   - The Company will compute an incentive return factor to be applied to the projected balance in the DSM Account for the up-coming review period. This will be based on a projection of the unrecovered balance in that account as of the close of each month during the period.
   - The incentive return factor will reflect the Company's then-current capital structure and then-current cost of debt and equity, plus an equity incentive of three percentage points added to the Company's Commission-approved return on equity ("ROE").
   - The sum of these monthly amounts will be adjusted for any over- or under-recovery of the return in the immediate past period. The past period over- or under-recovery will be measured based on the actual monthly balances in the DSM Account during the period.
3. **Lost net margin revenue forecasted to occur as a result of the DSM programs reducing demand charges and megawatt hour sales between each retail electric rate case.**
   - The Company defines lost margins as equal to the electric revenue by rate schedule less fuel costs.

Q. WHAT IS YOUR OPINION REGARDING SCE&G'S PROPOSED DSM COST RECOVERY AND INCENTIVE MECHANISMS?

A. My opinion is as follows:

- Most utilities with DSM cost recovery mechanisms expense DSM costs annually. However, Navigant Consulting is aware that Progress Energy Carolinas, Inc. per Commission Order No. 2009-373 in Docket No. 2008-151-E and utilities in Nevada capitalize and amortize DSM costs. Capitalizing and amortizing DSM costs smooth rate impacts of large swings in annual DSM spending, but delays full recovery of costs, and thus boosts recovery risk.[2] Here, SCE&G is seeking a five-year amortization period in lieu of expensing the DSM costs.
- Adding 3% to the Commission-approved return on equity ("ROE") is not an ideal incentive procedure. Calculating this bonus as an addition to the ROE does not reflect the Company's complete current capital structure. An incentive would be more appropriately added to the Company's total rate of return.
- Defining lost margin in the manner the Company did is not the industry standard. The Company defines lost margin as follows (see Exhibit 1 of the Company's proposal):

  "Margin revenue will equal electric revenue by rate schedule less fuel costs and will be computed on a per KWH basis."

  The industry standard definition includes other variable O&M costs in addition to fuel costs in the calculation, for example:

[2] Source: United States Department of Energy and EPA, 2007, Aligning Utility Incentives in Energy Efficiency http://www.epa.gov/cleanenergy/energy-programs/napee/reources/guides.html.

Lost Margin Revenue = Lost Revenue – Fuel Costs – Variable O&M Costs

Q. WHAT ARE YOUR RECOMMENDATIONS REGARDING SCE&G'S PROPOSED DSM COST RECOVERY AND INCENTIVE MECHANISMS?

A. Our recommendations include the following:

- The Company's request to amortize DSM expenses for the three-year program plan over five years is not opposed; however, it should be noted that at the end of the three-year program plan, the procedure for booking future expenses is subject to review.
- The Company should change the procedure for the incentive return factor in two ways. The Company should: 1) add the incentive to the Company's total rate of return – not just to the ROE portion of the rate of return; and 2) apply the factor on a graduated scale based on energy savings performance related to planned goals. Adding the incentive return factor to the total rate of return of 8.36% as calculated in the Company's latest available Quarterly Report and updated with each annual DSM filing rather than to the ROE portion results in a return that is more reasonable and more representative of the Company's current rate of return structure. Taking the procedure further, applying the incentive return factor on a graduated scale based on energy savings ties the Company's performance incentive more directly to program performance and not only to program costs. For instance:

% of Energy Savings Goal Achieved	Incentive Return Adder
75%	1%
100%	2%
125%	3%
150%	4%

In this example, the Company would use the incentive return adder of 2% during the program year. At program year-end, a true-up would be applied realizing the incentive return adder that corresponds to reported actual energy savings as a percentage of overall planned savings goal. While the first year goals appear to be reasonable for new energy efficiency programs, some additional benchmarking against other states' targets should be completed to assure the targets are appropriate.

- The Company should change the definition of Lost Margin Revenue to include variable O&M costs.

Q. WHAT IS YOUR OVERALL ASSESSMENT OF SCE&G'S FILING?

A. I believe that the Company's filing is a good first step in starting a viable portfolio of DSM programs for the Company's customers in South Carolina. In this testimony, we have identified some opportunities for improving on the Company's filing in four areas:

1. The Company's proposed programs;
2. Program evaluation practices;
3. Cost recovery and financial incentive proposals; and,

4. Regulatory reporting practices.

Adopting these recommendations would result in a portfolio of DSM programs that better meets the needs of the Company's customers, aligns the Company's financial incentives with actual program performance, and provides greater confidence in the program results through increased independence and transparency regarding program evaluations.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

APPENDIX

RANDY GUNN, MS

AREAS OF QUALIFICATION

- Energy services program development, management, and evaluation
- Energy services market and technology assessments
- DSM benefit-cost analysis
- Integrated resource planning
- Renewable energy strategy and program development
- Strategic planning

EDUCATION

- Humphrey Institute, University of Minnesota, Minneapolis, MA, Planning, 1995
- Carleton College, Northfield, Minnesota BA, Physics, 1980

EMPLOYMENT HISTORY

- *Managing Director, Energy Practice, Navigant Consulting (2010-Present).* Responsible for DSM program evaluations, DSM potential studies, DSM planning and regulatory studies, energy services program and product development, energy services market and technology assessments, benefit-cost analysis, and the DSM aspects of integrated resource planning.
- *Founder and Principal, Energy Practice, Summit Blue Consulting (2000-2010).* Responsible for DSM potential studies, DSM planning studies, energy services program and product development, management, and evaluation, energy services market and technology assessments, benefit-cost analysis, integrated resource planning, and renewable energy program development.
- *Manager of Utility Consulting, Sieben Energy Associates, LLC (1999 - 2000).* Responsible for energy services and renewable program development and evaluation, market potential analysis, integrated resource planning, and benchmarking analysis.
- *Energy Consultant, Sieben Energy Associates, LLC (1998 - 1999).* Responsible for utility energy services program development, utility integrated resource plan consulting, energy audits and analysis, and energy supplier selection consulting.
- *Northern States Power Company, Market Planning Consultant (1992 - 1998).* Responsible for DSM potential studies, DSM market and impact assessments and evaluations, DSM program development, integrated resource planning, and benchmarking analysis.
- *Northern States Power Company, Product Development Consultant (1987 - 1992).* Developed six marketing programs with multi-million dollar budgets and impacts — all programs successful and continuing five to ten years later. Also responsible for DSM program evaluation.
- *Northern States Power Company, Product Manager (1983 - 1987).* Responsible for managing load management programs, commercial and industrial energy auditing programs, efficient lighting programs, as well as solar domestic hot water program development, management, and evaluation.
- *Northern States Power Company, Demonstration Project Consultant (1981 - 1983).* Developed and implemented NSP's first electric conservation program — a rebate program for energy efficient home appliances. Program successful and continuing 19 years later.
- *Solar Components of MN, Director of Product Development (1980 - 1981).* Expanded this start-up company's product line considerably through product research and analysis. Also conducted sales calls.

RECENT PROFESSIONAL EXPERIENCE

- ***DSM Potential and Benefit-Cost Analysis Studies:*** Principal-in-Charge or project manager for several DSM potential studies that included DSM benefit-cost analysis tasks. The benefit-cost analyses for these projects were done using a variety of approaches, including simple spreadsheets, and more complex DSM benefit-cost analysis models such as DSMore. These projects were conducted for AEP Ohio, APCO, Colorado Springs Utilities, Hoosier Energy, the Minnesota Office of Energy Security, Duke Energy Indiana, Kansas City Power and Light, the Kansas Energy Council, Nebraska Public Power District, Northern California Power Authority, and Nova Scotia Power. The studies for Nova Scotia Power and Duke Energy were submitted by the utilities to regulatory commissions in the responsible jurisdictions. (2006-2009)

- ***Market Characterization Studies:*** Managed several market characterization studies for utilities and energy efficiency organizations. The largest of these studies, for Xcel Energy Minnesota, includes conducting energy audits and decision maker surveys for random samples of over 500 commercial, industrial, and institutional customers, as well as over 500 audits for residential customers. This data will be used to calculate the current saturations of energy efficiency measures (EEMs), determine the primary remaining barriers to further EEM installations, and to calculate the DSM potential for integrated resource planning purposes. Results of three of these studies were presented to stakeholder groups, and were used in preparing the demand side management parts of the utilities' integrated resource plans. Preliminary results from the Xcel Energy study were presented in a 2002 paper for the National Energy Services conference. (2001-2006) Conducted similar studies for Otter Tail Power Company in 2001-2002 and 2009-2010.

- ***Program Evaluations:*** Principal-in-Charge for impact and process evaluations for ComEd's entire portfolio of Illinois DSM programs. The focus of the evaluations was on impact analysis, while early evaluation efforts also included significant process evaluations (2008-2010). Also Principal-in-Charge for impact and process evaluations for AEP Ohio's entire portfolio of DSM programs. Managed a process and market evaluation for Xcel Energy's Commercial/Industrial Boiler Efficiency Program. This project revealed a number of opportunities to increase customers' awareness of the program, which is the Company's largest natural gas program (2005-2006). Managed a process and market evaluation for an Alliant Energy's Performance Contracting Program. This evaluation led to a number of suggestions to increase trade ally involvement in the program as well as increase customer understanding of the program and its goals (2005). Principal investigator for an evaluation for Xcel Energy's DSM Bidding program. This evaluation investigated the causes of the program's low goal achievement, net-to-gross ratio factors such as free ridership, customer and bidder satisfaction with the program and suggestions for improving future versions of the program (2001).

- ***Testimony on DSM and related filings:*** Delivered testimony regarding Nova Scotia Power Company's proposed DSM program plan in 2008. Also testified on First Energy's Ohio Energy Security Plan in 2008.

- ***Impact assessments:*** Managed a broad-based assessment or audit for all of Xcel Energy's Minnesota DSM programs. This project involved evaluating all program impact assumptions to ensure that they are consistent with current industry estimates. Only secondary sources were used for the project (2001-2002).

- ***Regulating DSM Spending:*** Principal investigator for a study on how best to regulate DSM spending. The Canadian Association of Members of Public Utility Tribunals (CAMPUT) engaged

Summit Blue Consulting and the Regulatory Assistance Project (RAP) to assess the current state of DSM (both gas and electric) in selected key jurisdictions that are active in DSM. The goal of the research was to determine the appropriate level of spending on DSM and the best mechanisms to ensure testing of costs/benefits with a view to adopting guidelines for use by utilities and regulators across Canada. The Summit Blue team conducted in-depth telephone interviews with regulatory, utility and other staff in roughly 15 states and provinces whose experiences would be useful to CAMPUT. These interviews, combined with the experience of Summit Blue and RAP and general literature in the field, were used to prepare a comprehensive report and an appendix containing detailed summaries of each jurisdiction. This research established industry benchmarks and practices across North America and has been widely cited and read in the industry. (2005-2006)

- ***Demand Response Potential Study:*** Principal investigator for a study on demand response resources for the International Energy Agency (IEA) that focused on the assessment of portfolio of demand response programs and how these should be integrated in a resource planning framework that accounts for synergies among programs, risks to ratepayers, and overall market efficiencies. These efforts were part of the IEA Task XIII Demand Response Resources (DRR) study. Summit Blue evaluated approaches for assessing DRR including basic benchmark approaches, applications of standard benefit cost tests, assessments based on increased reliability resulting from DRR, and a case study modeling effort, which addressed a resource planning approach for valuing DRR. The case study included changes in system costs with and without DRR included in a portfolio of resources. The difference in system costs over a 19 year time horizon provides an estimate of the value of DRR for the electric system. Summit Blue used New Energy Associates' Strategist® Strategic Planning Model for this effort. In addition, as part of the IEA project, Summit Blue conducted a detailed survey of 40 North American utilities to gather information on their demand response programs. The survey topics included the types of demand response programs the utilities are conducting, program participation and demand reduction impacts. (2004-2005)

- ***IRP and DSM Collaborative Groups:*** Provided facilitation and key analytical support for IRP and DSM collaborative groups for Public Service Company of New Mexico, Nova Scotia Power, and Xcel Energy/Northern States Power. Work most recently includes overall IRP planning and facilitation, as well as DSM specific planning and facilitation. Work in Minnesota was in response to a specific IRP order from the Minnesota Public Utilities Commission (2001-2008).

- ***Demand Response Market Study:*** Managed an extensive market survey of Midwestern investor-owned utilities' demand response programs, as well as a sampling of utilities throughout the country. The focus of the effort was on newer buy-back type programs, in which utilities offer customers market-based price incentives for reducing their loads at peak times. A summary of the results of this effort was presented in a 2001 paper for the National Energy Services conference (2001).

- ***Solar DHW Program:*** Developed, managed, and evaluated a solar domestic hot water program for a large Midwestern utility. The program offered customers low-interest loans to finance solar DHW systems. Managed a process and impact program evaluation, including surveys of program participants to gauge their satisfaction with the program.

RECENT PUBLICATIONS

Review of Recent Midwest DSM Potential Studies 2008. 2008 ACEEE Summer Study on Energy Efficiency in Buildings. American Council for an Energy Efficient Economy: Washington, D.C.

Benchmarking the Potential for Demand Response Programs 2006. 16th National Energy Services Conference Proceedings. Association of Energy Services Professionals International: Jupiter FL.

The Energy Conservation Potential for Retro-Commissioning 2004. 12th National Conference on Building Commissioning. Portland Energy Conservation Inc.: Portland, OR.

Xcel Energy DSM Potential Study 2002. 13th National Energy Services Conference Proceedings. Association of Energy Services Professionals International: Jupiter FL.

Load Management Buyback Programs 2001. 12th National Energy Services Conference Proceedings. Association of Energy Services Professionals International: Jupiter FL.

Community Energy Cooperative Lighting Retrofit Program 2001. 12th National Energy Services Conference Proceedings. Association of Energy Services Professionals International: Jupiter FL.

Energy Service Providers Value Added Services 2000. 11th National Energy Services Conference Proceedings. Association of Energy Services Professionals International: Jupiter FL.